UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
TORRES, JOSEPH D

ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 01/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/072,579	KIM ET AL.
	Examiner	Art Unit
	Joseph D. Torres	2133

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _11 August 2004_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
   closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-20_ is/are pending in the application.

   4a) Of the above claim(s) _9-20_ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-8_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _06 February 2002_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☒ All   b)☐ Some * c)☐ None of:

   1.☒ Certified copies of the priority documents have been received.

   2.☐ Certified copies of the priority documents have been received in Application No. _____.

   3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
      application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
   Paper No(s)/Mail Date _11/02, 7/04_.
4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1.   Applicant's election with traverse of Group I in the reply filed on 08/11/2004 is

acknowledged. The traversal is on the ground(s) that "it is believed that Claims 1-8 and

Claims 15-17 may be combined and examined as one group of claims, rather than the

two groups as indicated by the Examiner". This is not found persuasive for the following

readsons:

The Applicant contends, "Group I relates to a method for rearranging sub-codes by

rearranging sub-codes of a sub-code set with a same or different code rate, and Group

III relates to an apparatus for rearranging sub-codes comprising controller for

rearranging sub-codes in sub-code sets of quasi- complementary turbo codes (QCTCs)

corresponding to a plurality of given code rates and a puncturing and repetition control

signal". However, the Examiner asserts that "an apparatus for rearranging sub-codes

comprising controller for rearranging sub-codes in sub-code sets of quasi-

complementary turbo codes (QCTCs) corresponding to a plurality of given code rates

and a puncturing and repetition control signal" as cited in claim 15 is not required to nor

does it recite "a method for rearranging sub-codes by rearranging sub-codes of a sub-

code set with a same or different code rate" as required by claim 1.

The Applicant contends, "Specifically, Claim 4 of Group I recites a matrix performing

puncturing and repetition; Group 111 also recites this element". However, The

Examiner asserts that neither claim 1 or claim 4 recite nor require a "repetition control

signal for a matrix following a matrix used for a previous transmission among the

rearranged matrixes of the selected QCTC" as recited in claim 15. In fact, there is no

limitation in any of claims 1-8 that even suggest that any hardware is required to carry

out the limitations in claims 1-8 since turbo codes can be generated using a generator

matrix and since claim 1 recites that the rearrangement takes place on sub-codes to be

transmitted, but does not recite any step for transmitting over a channel requiring

hardware for transmitting.

The requirement is still deemed proper and is therefore made FINAL.

Claims 9-20 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as

being drawn to a nonelected invention, there being no allowable generic or linking claim.

Applicant timely traversed the restriction (election) requirement in the reply filed on

08/11/2004.

Information Disclosure Statement

2.   Items as noted on the returned PTO-1449 forms filed 11/13/2002 and 07/15/2004

fail to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because no

translation of the documents was found in the application files. It has been placed in the

application file, but the information referred to therein has not been considered as to the

merits. Applicant is advised that the date of any re-submission of any item of

information contained in this information disclosure statement or the submission of any

missing element(s) will be the date of submission for purposes of determining

compliance with the requirements based on the time of filing the statement, including all

certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609

¶ C(1).

Drawings

3.   The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5)

because they include the following reference character(s) not mentioned in the

description: '607', '807' and '1111'. Corrected drawing sheets in compliance with 37

CFR 1.121(d), or amendment to the specification to add the reference character(s) in

the description in compliance with 37 CFR 1.121(b) are required in reply to the Office

action to avoid abandonment of the application. Any amended replacement drawing

sheet should include all of the figures appearing on the immediate prior version of the

sheet, even if only one figure is being amended. The replacement sheet(s) should be

labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to

obstruct any portion of the drawing figures. If the changes are not accepted by the

examiner, the applicant will be notified and informed of any required corrective action in

the next Office action. The objection to the drawings will not be held in abeyance.

Specification

4.   The disclosure is objected to because of the following informalities: the Applicant

appears to be using sub-code to have two different meanings which renders the use of

sub-code in the claims indefinite. For example in lines 7-18 on page 10 of the

Applicant's specification, the applicant is clearly using sub-code to mean a set of

codewords defined by a particular algorithm for generating codewords since a code rate

is a property of the set of codewords and not the codewords themselves. In addition,

the applicant associates each sub-code with a generating matrix for generating the sub-

code. However, in claim 1 the Applicant recites "rearranging sub-codes of a sub-code

set with a same or different code rate that is to be transmitted", which implies that the

Applicant is using sub-code to means a codeword or codeword symbols since

codewords are transmitted, i.e., the codeword symbols generated by the matrix

representation for the sub-code are transmitted, not the matrix or the sub-code.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5.   Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph, as based on a

disclosure which is not enabling. A clear and definite definition of quasi-complementary

turbo codes is critical or essential to the practice of the invention, but is not included in

the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188

USPQ 356 (CCPA 1976). Note: references to foreign documents not written in English

or examples of what a quasi-complementary turbo code may be do not comprise a

definition.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6.   Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites, "rearranging **sub-codes of a sub-code** set with a same or different code rate **that is to be transmitted after a sub-code with a predetermined code rate**" [Emphasis Added], which is incomprehensible. The language in the limitation is ambiguous and indefinite.

In particular, the relationship between sub-code sets and a QCTC is indefinite, that is, it is not clear whether sub-code sets refers to a set of sub-codes whereby a particular sub-code within the set of sub-codes is defined by a particular algorithm for generating codewords of the sub-code or whether the applicant is attempting to use sub-code sets to refer to sets whereby each sub-code set contains codewords or portions of codewords of the sub-code defined by a particular algorithm for generating codewords. The phrase "rearranging **sub-codes of a sub-code** set" [Emphasis Added] gives the impression that sub-code sets refers to a set of sub-codes whereby a particular sub-code within the set of sub-codes is defined by a particular algorithm for generating codewords, whereas the phrase "**is to be transmitted**" [Emphasis Added] gives the impression that the Applicant is attempting to use sub-code sets to refer to sets whereby each sub-code set contains codewords or portions of codewords of the sub-

code defined by a particular algorithm for generating codewords since a sub-code

defined by a particular algorithm for generating codewords cannot be transmitted.

Claim 2 recites, "the sub-code is a matrix". A sub-code is a set of codewords defined by

a particular algorithm for generating codewords of the sub-code, not a matrix. The

Examiner assumes the matrix is a generator used for generating the sub-code.

Claims 3, 5 and 7 recite, "generating new sub-code sets, a matrix for each sub-code in

each new sub-code set having as many columns as the least common multiple of the

numbers of columns of each sub-code in **the sub-code sets**" [Emphasis Added]. The

sub-code sets includes the new sub-code sets since a new sub-code set is still a sub-

code set, which renders the previously quoted language meaningless.

Claim 5 recites, "each sub-code of the sub-code set being a matrix". A sub-code my be

represented by a matrix or generated by a matrix since a sub-code is the set of

codewords generated by a particular algorithm, but a sub-code is not a matrix.

Claim 5 recites, "generating sub-code sets of QCTCs corresponding to a plurality of

given code rates, each sub-code of the sub-code set being a matrix with elements

representing repetition and puncturing", which is indefinite since it is not clears whether

the "plurality of given code rates" refers to the code rates of the sub-codes or the code

rates of the QCTCs

Claim 6 recites, "rearranging sub-codes in sub-code sets of QCTCs corresponding to a

plurality of given code rates and storing the rearranged sub-codes", which is indefinite

since it is not clears whether the "plurality of given code rates" refers to the code rates

of the sub-codes or the code rates of the QCTCs

Claims 4 and 6 recite, "elements of the matrix have a uniform distribution of repetition and puncturing" is incomprehensible. How can "elements" of a matrix have uniform distribution of repletion and puncturing?

Claims 1-8 rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01.

Claim 1 recites, "rearranging **sub-codes of a sub-code** set with a same or different code rate **that is to be transmitted after a sub-code with a predetermined code rate**" [Emphasis Added]. In particular, the relationship between sub-code sets and a QCTC is indefinite, that is, it is not clear whether sub-code sets refers to a set of sub-codes whereby a particular sub-code within the set of sub-codes is defined by a particular algorithm for generating codewords of the sub-code or whether the applicant is attempting to use sub-code sets to refer to sets whereby each sub-code set contains codewords or portions of codewords of the sub-code defined by a particular algorithm for generating codewords. The omitted structural cooperative relationships are: the relationship between QCTCs, sub-codes and codewords of either the QCTCs or the sub-codes.

Claim 2 recites, "the sub-code is a matrix". The omitted structural cooperative relationships are: the relationship between "the sub-code" and a "matrix".

Claims 3, 5 and 7 recite, "generating new sub-code sets, a matrix for each sub-code in each new sub-code set having as many columns as the least common multiple of the numbers of columns of each sub-code in **the sub-code sets**" [Emphasis Added]. The omitted structural cooperative relationships are: the relationship between "priority", "new sub-code sets" and a "the sub-code sets".

Claims 3, 5 and 7 recite, "determining priority of the matrixes of sub-codes in each new sub-code set so that a matrix generated by combining matrixes from two of the new sub-code sets has a QCTC characteristic". The omitted structural cooperative relationships are: the relationship between "priority", "QCTCs" and a "QCTC characteristic".

Claim 5 recites, "generating sub-code sets of QCTCs corresponding to a plurality of given code rates, each sub-code of the sub-code set being a matrix with elements representing repetition and puncturing". The omitted structural cooperative relationships are: the relationship between "QCTCs" and "sub-code".

Claim 6 recites, "rearranging sub-codes in sub-code sets of QCTCs corresponding to a plurality of given code rates and storing the rearranged sub-codes". The omitted structural cooperative relationships are: the relationship between "sub-codes" and "QCTCs".

Claim 6 recites, "transmitting symbols using a sub-code in the sub-code set of the selected QCTC". The omitted structural cooperative relationships are: the relationship between "symbols" and a "sub-code".

Claims 4 and 6 recite, "elements of the matrix have a uniform distribution of repetition and puncturing". The omitted structural cooperative relationships are: the relationship between "elements of the matrix", "repetition" and "puncturing".

The Examiner asserts that claims 1-8 are replete with 112 problems and appear to be a foreign translation. The Applicant must review and revise the claims so that they are written in grammatically correct idiomatic English making use of a translator, if necessary.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7.   Claims 1-5 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. There is no limitation in any of claims 1-8 that even suggest that any hardware is required to carry out the limitations in claims 1-8 since turbo codes can be generated using a generator matrix and since claim 1 recites that the rearrangement takes place on sub-codes to be transmitted, but does not recite any step for transmitting over a channel requiring hardware for transmitting. Hence claims 1-8 are non-statutory since all of the limitations in claims 1-8 can be carried out by hand or in a computer program.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8.   Claims 1 and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Park;

Chang-Soo et al. (US 6397367 B1, hereafter referred to as Park).

35 U.S.C. 102(e) rejection of claim 1.

Park teaches generating sub-code sets of QCTCs with given code rates (Rate Matcher

1304 generates a first sub-code with a give code rate); and rearranging sub-codes of a

sub-code set with a same or different code rate that is to be transmitted after a sub-

code with a predetermined code rate (MUX 1305 in Figure 13 of Park is a device for

rearranging sub-code codewords or portions of the codewords in a sub-code set with a

same or different code rate that is to be transmitted).

35 U.S.C. 102(e) rejection of claim 6.

Park teaches rearranging sub-codes in sub-code sets of QCTCs corresponding to a

plurality of given code rates and storing the rearranged sub-codes (MUX 1305 in Figure

13 of Park is a device for rearranging sub-code codewords or portions of the codewords

in a sub-code set with a same or different code rate that is to be transmitted); selecting

a QCTC with a code rate determined for transmission (MUX 1305 in Figure 13 of Park is

a device for selecting a QCTC with a code rate determined for transmission); and

transmitting symbols using a sub-code in the sub-code set of the selected QCTC

(Transmitter 1309 in Figure 13 of Park is a device for transmitting symbols using a sub-

code in the sub-code set of the selected QCTC).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating obviousness or nonobviousness.

9.   Claims 2-5, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Park; Chang-Soo et al. (US 6397367 B1, hereafter referred to as Park) in view of

Moulsley; Timothy J. (US 6671851 B1).

35 U.S.C. 103(a) rejection of claims 2-5, 7 and 8.

Park substantially teaches the claimed invention described in claim 2 (as rejected

above).

However Park does not explicitly teach the specific use of repetition or puncturing

matrices for generating the repetition or punctured sub-codes taught in Park.

Moulsley, in an analogous art, teaches use of repetition or puncturing matrices for

generating the repetition or punctured sub-codes taught in Park (see Figure 2 in

Moulsley).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to modify Park with the teachings of Moulsley by including use of

repetition or puncturing matrices for generating the repetition or punctured sub-codes

taught in Park. This modification would have been obvious to one of ordinary skill in the

art, at the time the invention was made, because one of ordinary skill in the art would

have recognized that use of repetition or puncturing matrices for generating the

repetition or punctured sub-codes taught in Park would have provided a means for

generating the repetition and punctured sub-codes taught in Park.

Conclusion

10.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure. Li; Jifeng (US 6519732 B1) teaches puncturing and the use of

complementary convolutional codes as they may apply to a turbo encoding apparatus.

Maerkle; Rainer Thomas et al. (US 6684367 B1) teaches puncturing and the use of

complementary convolutional codes as they may apply to a turbo encoding apparatus.
Furuskar; Anders L. et al. (US 6704898 B1) teaches puncturing and the use of
complementary convolutional codes as they may apply to a turbo encoding apparatus.

Any inquiry concerning this communication or earlier communications from the
examiner should be directed to Joseph D. Torres whose telephone number is (571)
272-3829. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's
supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number
for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent
Application Information Retrieval (PAIR) system. Status information for published
applications may be obtained from either Private PAIR or Public PAIR. Status
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more information about the PAIR system, see http://pair-direct.uspto.gov. Should you
have questions on access to the Private PAIR system, contact the Electronic Business
Center (EBC) at 866-217-9197 (toll-free).

Joseph D. Torres, PhD
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Art Unit 2133